



SEQUENCE LISTING

<110> RASTELLI, LUCA

<120> NOVEL SPHINGOSINE KINASES AND NUCLEIC ACIDS ENCODING
SAME

<130> 10716-08

<140> 09/784,810

<141> 2001-02-14

<150> 60/182,360

<151> 2000-02-14

<150> 60/191,261

<151> 2000-03-22

<160> 29

<170> PatentIn Ver. 2.1

<210> 1

<211> 1600

<212> DNA

<213> Homo sapiens

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<221> modified_base

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<223> a, t, c, g, other or unknown

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<210> 2

<211> 384

<212> PRT

<213> Homo sapiens

<400> 2

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1

5

10

15

Val Leu Val Leu Leu Asn Pro Arg Gly Gly Lys Gly Lys Ala Leu Gln

20

25

30

Leu Phe Arg Ser His Val Gln Pro Leu Leu Ala Glu Ala Glu Ile Ser

35

40

45

Phe Thr Leu Met Leu Thr Glu Arg Arg Asn His Ala Arg Glu Leu Val

50

55

60

Arg Ser Glu Glu Leu Gly Arg Trp Asp Ala Leu Val Val Met Ser Gly

65

70

75

80

Asp Gly Leu Met His Glu Val Val Asn Gly Leu Met Glu Arg Pro Asp

85

90

95

Trp Glu Thr Ala Ile Gln Lys Pro Leu Cys Ser Leu Pro Ala Gly Ser

100	105	110	
Gly Asn Ala Leu Ala Ala Ser Leu Asn His Tyr Ala Gly Tyr Glu Gln			
115	120	125	
Val Thr Asn Glu Asp Leu Leu Thr Asn Cys Thr Leu Leu Leu Cys Arg			
130	135	140	
Pro Val Leu Ser Pro Met Asn Leu Leu Ser Leu His Thr Ala Ser Gly			
145	150	155	160
Leu Arg Ser Phe Ser Val Leu Ser Leu Ala Trp Gly Phe Ile Ala Asp			
165	170	175	
Val Asp Leu Glu Ser Asp Lys Tyr Arg Arg Leu Gly Glu Met Arg Phe			
180	185	190	
Thr Leu Gly Thr Phe Leu Arg Leu Ala Ala Leu Arg Thr Tyr Arg Gly			
195	200	205	
Arg Leu Ala Thr Leu Pro Val Gly Arg Val Gly Phe Lys Thr Pro Ala			
210	215	220	
Ser Pro Val Val Val Gln Gln Gly Pro Val Asp Ala His Leu Val Pro			
225	230	235	240
Leu Glu Glu Gln Val Pro Ser His Trp Gln Val Val Pro Asp Glu Asp			
245	250	255	

Phe Val Leu Val Leu Ala Leu Leu His Ser His Leu Ala Ser Glu Met

260

265

270

Phe Ala Ala Pro Met Gly Arg Cys Ala Ala Gly Val Met His Leu Phe

275

280

285

Tyr Val Arg Ala Gly Val Ser Arg Ala Met Leu Leu Arg Leu Phe Leu

290

295

300

Ala Met Glu Lys Gly Arg His Met Glu Tyr Glu Cys Pro Tyr Leu Val

305

310

315

320

Tyr Val Pro Val Val Ala Phe Arg Leu Glu Pro Lys Asp Gly Lys Gly

325

330

335

Val Phe Ala Val Asp Gly Glu Leu Met Val Ser Glu Ala Val Gln Gly

340

345

350

Gln Val His Pro Asn Tyr Phe Trp Met Val Ser Gly Cys Val Glu Pro

355

360

365

Pro Pro Ser Trp Lys Pro Gln Gln Met Pro Pro Pro Glu Glu Pro Leu

370

375

380

<210> 3

<211> 1759

<212> DNA

<213> Mus musculus

<400> 3

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<210> 4

<211> 382

<212> PRT

<213> Mus musculus

<400> 4

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20 25 30

Leu Phe Gln Ser Arg Val Gln Pro Phe Leu Glu Glu Ala Glu Ile Thr

35 40 45

Phe Lys Leu Ile Leu Thr Glu Arg Lys Asn His Ala Arg Glu Leu Val

50 55 60

Cys Ala Glu Glu Leu Gly His Trp Asp Ala Leu Ala Val Met Ser Gly

65 70 75 80

Asp Gly Leu Met His Glu Val Val Asn Gly Leu Met Glu Arg Pro Asp

85 90 95

Trp Glu Thr Ala Ile Gln Lys Pro Leu Cys Ser Leu Pro Gly Gly Ser

100

105

110

Gly Asn Ala Leu Ala Ala Ser Val Asn His Tyr Ala Gly Tyr Glu Gln

115

120

125

Val Thr Asn Glu Asp Leu Leu Ile Asn Cys Thr Leu Leu Leu Cys Arg

130

135

140

Arg Arg Leu Ser Pro Met Asn Leu Leu Ser Leu His Thr Ala Ser Gly

145

150

155

160

Leu Arg Leu Tyr Ser Val Leu Ser Leu Ser Trp Gly Phe Val Ala Asp

165

170

175

Val Asp Leu Glu Ser Glu Lys Tyr Arg Arg Leu Gly Glu Ile Arg Phe

180

185

190

Thr Val Gly Thr Phe Phe Arg Leu Ala Ser Leu Arg Ile Tyr Gln Gly

195

200

205

Gln Leu Ala Tyr Leu Pro Val Gly Thr Val Ala Ser Lys Arg Pro Ala

210

215

220

Ser Thr Leu Val Gln Lys Gly Pro Val Asp Thr His Leu Val Pro Leu

225

230

235

240

Glu Glu Pro Val Pro Ser His Trp Thr Val Val Pro Glu Gln Asp Phe

245	250	255
Val Leu Val Leu Val Leu Leu His Thr His Leu Ser Ser Glu Leu Phe		
260	265	270
Ala Ala Pro Met Gly Arg Cys Glu Ala Gly Val Met His Leu Phe Tyr		
275	280	285
Val Arg Ala Gly Val Ser Arg Ala Ala Leu Leu Arg Leu Phe Leu Ala		
290	295	300
Met Gln Lys Gly Lys His Met Glu Leu Asp Cys Pro Tyr Leu Val His		
305	310	315
320		
Val Pro Val Val Ala Phe Arg Leu Glu Pro Arg Ser Gln Arg Gly Val		
325	330	335
Phe Ser Val Asp Gly Glu Leu Met Val Cys Glu Ala Val Gln Gly Gln		
340	345	350
Val His Pro Asn Tyr Leu Trp Met Val Cys Gly Ser Arg Asp Ala Pro		
355	360	365
Ser Gly Arg Asp Ser Arg Arg Gly Pro Pro Pro Glu Glu Pro		
370	375	380

<210> 5

<211> 1840

<212> DNA

<213> Homo sapiens

<400> 5

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<210> 6

<211> 471

<212> PRT

<213> Homo sapiens

<400> 6

Met Glu Lys Pro Tyr Ala Phe Thr Val His Cys Val Lys Arg Ala Arg

1 5 10 15

Arg His Arg Trp Lys Trp Ala Gln Val Thr Phe Trp Cys Pro Glu Glu

20 25 30

Gln Leu Cys His Leu Trp Leu Gln Thr Leu Arg Glu Met Leu Glu Lys

35 40 45

Leu Thr Ser Arg Pro Lys His Leu Leu Val Phe Ile Asn Pro Phe Gly

50 55 60

Gly Lys Gly Gln Gly Lys Arg Ile Tyr Glu Arg Lys Val Ala Pro Leu

65 70 75 80

Phe Thr Leu Ala Ser Ile Thr Thr Asp Ile Ile Gly Asn Lys Phe Tyr

85

90

95

Val Asn Tyr Val Glu Val Ile Thr Glu His Ala Asn Gln Ala Lys Glu

100

105

110

Thr Leu Tyr Glu Ile Asn Ile Asp Lys Tyr Asp Gly Ile Val Cys Val

115

120

125

Gly Gly Asp Gly Met Phe Ser Glu Val Leu His Gly Leu Ile Gly Arg

130

135

140

Thr Gln Arg Ser Ala Gly Val Asp Gln Asn His Pro Arg Ala Val Leu

145

150

155

160

Val Pro Ser Ser Leu Arg Ile Gly Ile Ile Pro Ala Gly Ser Thr Asp

165

170

175

Cys Val Cys Tyr Ser Thr Val Gly Thr Ser Asp Ala Glu Thr Ser Ala

180

185

190

Leu His Ile Val Val Gly Asp Ser Leu Ala Met Asp Val Ser Ser Val

195

200

205

His His Asn Ser Thr Leu Leu Arg Tyr Ser Val Ser Leu Leu Gly Tyr

210

215

220

Gly Phe Tyr Gly Asp Ile Ile Lys Asp Ser Glu Lys Lys Arg Trp Leu

225

230

235

240

Gly Leu Ala Arg Tyr Asp Phe Ser Gly Leu Lys Thr Phe Leu Ser His

245

250

255

His Cys Tyr Glu Gly Thr Val Ser Phe Leu Pro Ala Gln His Thr Val

260

265

270

Gly Ser Pro Arg Asp Arg Lys Pro Cys Arg Ala Gly Cys Phe Val Cys

275

280

285

Arg Gln Ser Lys Gln Gln Leu Glu Glu Glu Gln Lys Lys Ala Leu Tyr

290

295

300

Gly Leu Glu Ala Ala Glu Asp Val Glu Glu Trp Gln Val Val Cys Gly

305

310

315

320

Lys Phe Leu Ala Ile Asn Ala Thr Asn Met Ser Cys Ala Cys Arg Arg

325

330

335

Ser Pro Arg Gly Leu Ser Pro Ala Ala His Leu Gly Asp Gly Ser Ser

340

345

350

Asp Leu Ile Leu Ile Arg Lys Cys Ser Arg Phe Asn Phe Leu Arg Phe

355

360

365

Leu Ile Arg His Thr Asn Gln Gln Asp Gln Phe Asp Phe Thr Phe Val

370

375

380

Glu Val Tyr Arg Val Lys Lys Phe Gln Phe Thr Ser Lys His Met Glu

385 390 395 400

Asp Glu Asp Ser Asp Leu Lys Glu Gly Gly Lys Lys Arg Phe Gly His

405 410 415

Ile Cys Ser Ser His Pro Ser Cys Cys Cys Thr Val Ser Asn Ser Ser

420 425 430

Trp Asn Cys Asp Gly Glu Val Leu His Ser Pro Ala Ile Glu Val Arg

435 440 445

Val His Cys Gln Leu Val Arg Leu Phe Ala Arg Gly Ile Glu Glu Asn

450 455 460

Pro Lys Pro Asp Ser His Ser

465 470

<210> 7

<211> 522

<212> DNA

<213> Rattus sp.

<400> 7

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 ggacaagcac aggacatggt ggtggagttg atagccagga ac 522

<210> 8

<211> 144

<212> PRT

<213> Rattus sp.

<400> 8

Phe Leu Ala Ile Asn Ser Thr Asn Met Ser Cys Ala Cys Pro Arg Ser

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Pro Gly Gly Leu Ser Pro Phe Ala His Leu Gly Asp Gly Ser Ser Asp

20 25 30

Leu Ile Leu Ile Arg Lys Cys Ser Arg Phe Asn Phe Leu Arg Phe Leu

35 40 45

Ile Arg His Thr Asn Gln Glu Asp Gln Phe Gly Phe Thr Phe Val Glu

50 55 60

Val Tyr Arg Val Lys Lys Phe Gln Phe Thr Ser Lys His Val Glu Asp

65 70 75 80

Asp Asp Asn Asp Leu Lys Glu Leu Glu Lys Gln Lys Phe Gly Gln Ile

85 90 95

Cys Lys Asp Asn Pro Pro Cys Ala Cys Pro Thr Ser Arg Ser Ser Trp

100

105

110

Asn Cys Asp Gly Glu Val Leu His Ser Pro Ala Ile Glu Val Arg Val

115

120

125

His Cys Gln Leu Val Arg Leu Phe Ala Arg Gly Ile Glu Glu Glu Ser

130

135

140

<210> 9

<211> 382

<212> DNA

<213> Mus musculus

<400> 9

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<210> 10

<211> 79

<212> PRT

<213> Mus musculus

<400> 10

Tyr Arg Val Lys Lys Phe His Phe Thr Ser Lys His Val Glu Asp Glu

1

5

10

15

Asp Asn Asp Ser Lys Glu Gln Glu Lys Gln Lys Phe Gly Lys Ile Cys

20

25

30

Lys Asp Arg Pro Ser Cys Thr Cys Ser Ala Ser Arg Ser Ser Trp Asn

35

40

45

Cys Asp Gly Glu Val Met His Ser Pro Ala Ile Glu Val Arg Val His

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55

60

Cys Gln Leu Val Arg Leu Phe Ala Arg Gly Ile Glu Glu Glu Ser

65

70

75

<210> 11

<211> 326

<212> PRT

<213> Homo sapiens

<400> 11

Pro Lys His Leu Leu Val Phe Ile Asn Pro Phe Gly Gly Lys Gly Gln

1

5

10

15

Gly Lys Arg Ile Tyr Glu Arg Lys Val Ala Pro Leu Phe Thr Leu Ala

20

25

30

Ser Ile Thr Thr Asp Ile Ile Gly Asn Lys Phe Tyr Val Asn Tyr Val

35

40

45

Glu Val Ile Thr Glu His Ala Asn Gln Ala Lys Glu Thr Leu Tyr Glu

50

55

60

Ile Asn Ile Asp Lys Tyr Asp Gly Ile Val Cys Val Gly Gly Asp Gly

65

70

75

80

Met Phe Ser Glu Val Leu His Gly Leu Ile Gly Arg Thr Gln Arg Ser

85

90

95

Ala Gly Val Asp Gln Asn His Pro Arg Ala Val Leu Val Pro Ser Ser

100

105

110

Leu Arg Ile Gly Ile Ile Pro Ala Gly Ser Thr Asp Cys Val Cys Tyr

115

120

125

Ser Thr Val Gly Thr Ser Asp Ala Glu Thr Ser Ala Leu His Ile Val

130

135

140

Val Gly Asp Ser Leu Ala Met Asp Val Ser Ser Val His His Asn Ser

145

150

155

160

Thr Leu Leu Arg Tyr Ser Val Ser Leu Leu Gly Tyr Gly Phe Tyr Gly

165

170

175

Asp Ile Ile Lys Asp Ser Glu Lys Lys Arg Trp Leu Gly Leu Ala Arg

180

185

190

Tyr Asp Phe Ser Gly Leu Lys Thr Phe Leu Ser His His Cys Tyr Glu

195

200

205

Gly Thr Val Ser Phe Leu Pro Ala Gln His Thr Val Gly Ser Pro Arg

210

215

220

Asp Arg Lys Pro Cys Arg Ala Gly Cys Phe Val Cys Arg Gln Ser Lys

225

230

235

240

Gln Gln Leu Glu Glu Glu Gln Lys Lys Ala Leu Tyr Gly Leu Glu Ala

245

250

255

Ala Glu Asp Val Glu Glu Trp Gln Val Val Cys Gly Lys Phe Leu Ala

260

265

270

Ile Asn Ala Thr Asn Met Ser Cys Ala Cys Arg Arg Ser Pro Arg Gly

275

280

285

Leu Ser Pro Ala Ala His Leu Gly Asp Gly Ser Ser Asp Leu Ile Leu

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Ile Arg Lys Cys Ser Arg Phe Asn Phe Leu Arg Phe Leu Ile Arg His

305

310

315

320

Thr Asn Gln Gln Asp Gln

<210> 12

<211> 453

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 12

Leu Tyr Ile Asp Tyr Lys Pro His Ser Ser Ser His Leu Lys Glu Glu

1

5

10

15

Asp Asp Leu Val Glu Glu Ile Leu Lys Arg Ser Tyr Lys Asn Thr Arg

20

25

30

Arg Asn Lys Ser Ile Phe Val Ile Ile Asn Pro Phe Gly Gly Lys Gly

35

40

45

Lys Ala Lys Lys Leu Phe Met Thr Lys Ala Lys Pro Leu Leu Leu Ala

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55

60

Ser Arg Cys Ser Ile Glu Val Val Tyr Thr Lys Tyr Pro Gly His Ala

65

70

75

80

Ile Glu Ile Ala Arg Glu Met Asp Ile Asp Lys Tyr Asp Thr Ile Ala

85

90

95

Cys Ala Ser Gly Asp Gly Ile Pro His Glu Val Ile Asn Gly Leu Tyr

100

105

110

Gln Arg Pro Asp His Val Lys Ala Phe Asn Asn Ile Ala Ile Thr Glu

115

120

125

Ile Pro Cys Gly Ser Gly Asn Ala Met Ser Val Ser Cys His Trp Thr

130

135

140

Asn Asn Pro Ser Tyr Ser Thr Leu Cys Leu Ile Lys Ser Ile Glu Thr

145

150

155

160

Arg Ile Asp Leu Met Cys Cys Ser Gln Pro Ser Tyr Ala Arg Glu His

165

170

175

Pro Lys Leu Ser Phe Leu Ser Gln Thr Tyr Gly Leu Ile Ala Glu Thr

180

185

190

Asp Ile Asn Thr Glu Phe Ile Arg Trp Met Gly Pro Ala Arg Phe Glu

195

200

205

Leu Gly Val Ala Phe Asn Ile Ile Gln Lys Lys Lys Tyr Pro Cys Glu

210

215

220

Ile Tyr Val Lys Tyr Ala Ala Lys Ser Lys Asn Glu Leu Lys Asn His

225

230

235

240

Tyr Leu Glu His Lys Asn Lys Gly Ser Leu Glu Phe Gln His Ile Thr

245

250

255

Met Asn Lys Asp Asn Glu Asp Cys Asp Asn Tyr Asn Tyr Glu Asn Glu

260	265	270
Tyr Glu Thr Glu Asn Glu Asp Glu Asp Glu Asp Ala Asp Ala Asp Asp		
275	280	285
Glu Asp Ser His Leu Ile Ser Arg Asp Leu Ala Asp Ser Ser Ala Asp		
290	295	300
Gln Ile Lys Glu Glu Asp Phe Lys Ile Lys Tyr Pro Leu Asp Glu Gly		
305	310	315
Ile Pro Ser Asp Trp Glu Arg Leu Asp Pro Asn Ile Ser Asn Asn Leu		
325	330	335
Gly Ile Phe Tyr Thr Gly Lys Met Pro Tyr Val Ala Ala Asp Thr Lys		
340	345	350
Phe Phe Pro Ala Ala Leu Pro Ser Asp Gly Thr Met Asp Met Val Ile		
355	360	365
Thr Asp Ala Arg Thr Ser Leu Thr Arg Met Ala Pro Ile Leu Leu Gly		
370	375	380
Leu Asp Lys Gly Ser His Val Leu Gln Pro Glu Val Leu His Ser Lys		
385	390	395
Ile Leu Ala Tyr Lys Ile Ile Pro Lys Leu Gly Asn Gly Leu Phe Ser		
405	410	415

Val Asp Gly Glu Lys Phe Pro Leu Glu Pro Leu Gln Val Glu Ile Met

420

425

430

Pro Arg Leu Cys Lys Thr Leu Leu Arg Asn Gly Arg Tyr Val Asp Thr

435

440

445

Asp Phe Asp Ser Met

450

<210> 13

<211> 436

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 13

Leu Leu Ile Asp His Val Ser Arg Lys Ser Arg Ala Asn Thr Gly Glu

1

5

10

15

Glu Asn Ile Ser Ser Gly Thr Val Glu Glu Ile Leu Glu Lys Ser Tyr

20

25

30

Glu Asn Ser Lys Arg Asn Arg Ser Ile Leu Val Ile Ile Asn Pro His

35

40

45

Gly Gly Lys Gly Thr Ala Lys Asn Leu Phe Leu Thr Lys Ala Arg Pro

50

55

60

Ile Leu Val Glu Ser Gly Cys Lys Ile Glu Ile Ala Tyr Thr Lys Tyr

65	70	75	80
Ala Arg His Ala Ile Asp Ile Ala Lys Asp Leu Asp Ile Ser Lys Tyr			
85	90	95	
Asp Thr Ile Ala Cys Ala Ser Gly Asp Gly Ile Pro Tyr Glu Val Ile			
100	105	110	
Asn Gly Leu Tyr Arg Arg Pro Asp Arg Val Asp Ala Phe Asn Lys Leu			
115	120	125	
Ala Val Thr Gln Leu Pro Cys Gly Ser Gly Asn Ala Met Ser Ile Ser			
130	135	140	
Cys His Trp Thr Asn Asn Pro Ser Tyr Ala Ala Leu Cys Leu Val Lys			
145	150	155	160
Ser Ile Glu Thr Arg Ile Asp Leu Met Cys Cys Ser Gln Pro Ser Tyr			
165	170	175	
Met Asn Glu Trp Pro Arg Leu Ser Phe Leu Ser Gln Thr Tyr Gly Val			
180	185	190	
Ile Ala Glu Ser Asp Ile Asn Thr Glu Phe Ile Arg Trp Met Gly Pro			
195	200	205	
Val Arg Phe Asn Leu Gly Val Ala Phe Asn Ile Ile Gln Gly Lys Lys			
210	215	220	

Tyr Pro Cys Glu Val Phe Val Lys Tyr Ala Ala Lys Ser Lys Lys Glu
 225 230 235 240

Leu Lys Val His Phe Leu Glu Asn Lys Asp Lys Asn Lys Gly Cys Leu
 245 250 255

Thr Phe Glu Pro Asn Pro Ser Pro Asn Ser Ser Pro Asp Leu Leu Ser
 260 265 270

Lys Asn Asn Ile Asn Asn Ser Thr Lys Asp Glu Leu Ser Pro Asn Phe
 275 280 285

Leu Asn Glu Asp Asn Phe Lys Leu Lys Tyr Pro Met Thr Glu Pro Val
 290 295 300

Pro Arg Asp Trp Glu Lys Met Asp Ser Glu Leu Thr Asp Asn Leu Thr
 305 310 315 320

Ile Phe Tyr Thr Gly Lys Met Pro Tyr Ile Ala Lys Asp Thr Lys Phe
 325 330 335

Phe Pro Ala Ala Leu Pro Ala Asp Gly Thr Ile Asp Leu Val Ile Thr
 340 345 350

Asp Ala Arg Ile Pro Val Thr Arg Met Thr Pro Ile Leu Leu Ser Leu
 355 360 365

Asp Lys Gly Ser His Val Leu Glu Pro Glu Val Ile His Ser Lys Ile
 370 375 380

Leu Ala Tyr Lys Ile Ile Pro Lys Val Glu Ser Gly Leu Phe Ser Val

385

390

395

400

Asp Gly Glu Lys Phe Pro Leu Glu Pro Leu Gln Val Glu Ile Met Pro

405

410

415

Met Leu Cys Lys Thr Leu Leu Arg Asn Gly Arg Tyr Ile Asp Thr Glu

420

425

430

Phe Glu Ser Met

435

<210> 14

<211> 380

<212> PRT

<213> Schizosaccharomyces pombe

<400> 14

Cys Trp Val Asp Phe Val Glu Asn Ser Asp Gln Phe Cys Glu Tyr Leu

1

5

10

15

Leu Asp Val Ala Tyr Lys Gly Ile Lys Arg Ser Arg Arg Phe Ile Val

20

25

30

Phe Ile Asn Pro His Gly Gly Lys Gly Lys Ala Lys His Ile Trp Glu

35

40

45

Ser Glu Ala Glu Pro Val Phe Ser Ser Ala His Ser Ile Cys Glu Val

50

55

60

Val Leu Thr Arg Arg Lys Asp His Ala Lys Ser Ile Ala Lys Asn Leu

65

70

75

80

Asp Val Gly Ser Tyr Asp Gly Ile Leu Ser Val Gly Gly Asp Gly Leu

85

90

95

Phe His Glu Val Ile Asn Gly Leu Gly Glu Arg Asp Asp Tyr Leu Glu

100

105

110

Ala Phe Lys Leu Pro Val Cys Met Ile Pro Gly Gly Ser Gly Asn Ala

115

120

125

Phe Ser Tyr Asn Ala Thr Gly Gln Leu Lys Pro Ala Leu Thr Ala Leu

130

135

140

Glu Ile Leu Lys Gly Arg Pro Thr Ser Phe Asp Leu Met Thr Phe Glu

145

150

155

160

Gln Lys Gly Lys Lys Ala Tyr Ser Phe Leu Thr Ala Asn Tyr Gly Ile

165

170

175

Ile Ala Asp Cys Asp Ile Gly Thr Glu Asn Trp Arg Phe Met Gly Glu

180

185

190

Asn Arg Ala Tyr Leu Gly Phe Phe Leu Arg Leu Phe Gln Lys Pro Asp

195

200

205

Trp Lys Cys Ser Ile Glu Met Asp Val Val Ser Ser Asp Arg Thr Glu

210

215

220

Ile Lys His Met Tyr Glu Lys Ser Lys Asn Leu Ala Pro Met Ser Glu

225

230

235

240

Ser Ser Asp Ser Asp Lys Thr Val Ser Thr Ser Pro Glu Ser His Leu

245

250

255

Leu Thr Phe Glu Ile Asn Asp Leu Ser Ile Phe Cys Ala Gly Leu Leu

260

265

270

Pro Tyr Ile Ala Pro Asp Ala Lys Met Phe Pro Ala Ala Ser Asn Asp

275

280

285

Asp Gly Leu Ile Asp Val Val Ile Val Tyr Ser Lys Gln Phe Arg Lys

290

295

300

Ser Leu Leu Ser Met Phe Thr Gln Leu Asp Asn Gly Gly Phe Tyr Tyr

305

310

315

320

Ser Lys His Leu Asn Tyr Tyr Lys Val Arg Ser Phe Arg Phe Thr Pro

325

330

335

Val Asn Thr Gly Lys Arg His Tyr Phe Ala Leu Asp Gly Glu Ser Tyr

340

345

350

Pro Leu Glu Pro Phe Glu Cys Arg Val Ala Pro Lys Leu Gly Thr Thr

355

360

365

Leu Ser Pro Val Ala Gly Phe Gln Leu Leu Asp Ile

370

375

380

<210> 15

<211> 415

<212> PRT

<213> *Caenorhabditis elegans*

<400> 15

Cys Arg Ser Asp Ala Glu Glu Asn Glu Gln Leu Thr Ser Val Ile Leu

1

5

10

15

Ser Arg Lys Pro Pro Pro Gln Glu Gln Cys Arg Gly Asn Leu Leu Val

20

25

30

Phe Ile Asn Pro Asn Ser Gly Thr Gly Lys Ser Leu Glu Thr Phe Ala

35

40

45

Asn Thr Val Gly Pro Lys Leu Asp Lys Ser Leu Ile Arg Tyr Glu Val

50

55

60

Val Val Thr Thr Gly Pro Asn His Ala Arg Asn Val Leu Met Thr Lys

65

70

75

80

Ala Asp Leu Gly Lys Phe Asn Gly Val Leu Ile Leu Ser Gly Asp Gly

85

90

95

Leu Val Phe Glu Ala Leu Asn Gly Ile Leu Cys Arg Glu Asp Ala Phe

100

105

110

Arg Ile Phe Pro Thr Leu Pro Ile Gly Ile Val Pro Ser Gly Ser Gly

115

120

125

Asn Gly Leu Leu Cys Ser Val Leu Ser Lys Tyr Gly Thr Lys Met Asn

130

135

140

Glu Lys Ser Val Met Glu Arg Ala Leu Glu Ile Ala Thr Ser Pro Thr

145

150

155

160

Ala Lys Ala Glu Ser Val Ala Leu Tyr Ser Val Lys Thr Asp Asn Gln

165

170

175

Ser Tyr Ala Ser Phe Leu Ser Ile Gly Trp Gly Leu Met Ala Asp Ile

180

185

190

Asp Ile Asp Ser Glu Lys Trp Arg Lys Ser Leu Gly His His Arg Phe

195

200

205

Thr Val Met Gly Phe Ile Arg Ser Cys Asn Leu Arg Ser Tyr Lys Gly

210

215

220

Arg Leu Thr Tyr Arg Pro Tyr Lys Pro Lys Gly Phe His Pro Ser Ser

225

230

235

240

Asn Val Phe Ser Val Tyr Glu Lys Thr Thr Gln Gln Arg Ile Asp Asp

	245	250	255
Ser Lys Val Lys Thr Asn Gly Ser Val Ser Asp Ser Glu Glu Glu Thr			
	260	265	270
Met Glu Thr Lys Phe Gln Asn Trp Thr Leu Pro Asp Ser Asp Glu Thr			
	275	280	285
Leu Ala Val Gly Ser Ser Asp Leu Glu Glu Thr Val Val Ile Glu Asp			
	290	295	300
Asn Phe Val Asn Ile Tyr Ala Val Thr Leu Ser His Ile Ala Ala Asp			
305	310	315	320
Gly Pro Phe Ala Pro Ser Ala Lys Leu Glu Asp Asn Arg Ile His Leu			
	325	330	335
Ser Tyr Ile Leu Trp Lys Asp Ile Gly Thr Arg Val Asn Ile Ala Lys			
	340	345	350
Tyr Leu Leu Ala Ile Glu His Glu Thr His Leu Asp Leu Pro Phe Val			
	355	360	365
Lys His Val Glu Val Ser Ser Met Lys Leu Glu Val Ile Ser Glu Gly			
	370	375	380
Ser His Val Val Leu Asp Gly Glu Val Val Asp Thr Lys Thr Ile Glu			
385	390	395	400

Val Ala Ser Thr Lys Asn His Ile Ser Val Phe Ser Ser Thr Ala

405

410

415

<210> 16

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 16

Asn Glu Gln Lys

1

<210> 17

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 17

Asn His Gln Lys

1

<210> 18

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 18

Asn Asp Glu Gln

1

<210> 19

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 19

Gln His Arg Lys

1

<210> 20

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 20

Met Ile Leu Val

1

<210> 21

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 21

Met Ile Leu Phe

1

<210> 22

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 22

Ser Thr Asn Lys

1

<210> 23

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 23

Ser Thr Pro Ala

1

<210> 24

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 24

Ser Gly Asn Asp

1

<210> 25

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 25

Ser Asn Asp Glu Gln Lys

1

5

<210> 26

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 26

Asn Asp Glu Gln His Lys

1

5

<210> 27

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 27

Asn Glu Gln His Arg Lys

1

5

<210> 28

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Illustrative
motif

<400> 28

Val Leu Ile Met

1

<210> 29

<211> 182

<212> PRT

<213> Unknown Organism

<220>

<223> Description of Unknown Organism: 80432911

<400> 29

Ala Gly Ala Pro Gly Ala Asp Ala Cys Ser Val Pro Val Ser Glu Ile

1

5

10

15

Ile Ala Val Glu Glu Thr Asp Val His Gly Lys His Gln Gly Ser Gly

20

25

30

Lys Trp Gln Lys Met Glu Lys Pro Tyr Ala Phe Thr Val His Cys Val

35

40

45

Lys Arg Ala Arg Arg His Arg Trp Lys Trp Ala Gln Val Thr Phe Trp

50

55

60

Cys Pro Glu Glu Gln Leu Cys His Leu Trp Leu Gln Thr Leu Arg Glu

65

70

75

80

Met Leu Glu Lys Leu Thr Ser Arg Pro Lys His Leu Leu Val Phe Ile

85

90

95

Asn Pro Phe Gly Gly Lys Gly Gln Gly Lys Arg Ile Tyr Glu Arg Lys

100

105

110

Val Ala Pro Leu Phe Thr Leu Ala Ser Ile Thr Thr Asp Ile Ile Val

115

120

125

Thr Glu His Ala Asn Gln Ala Lys Glu Thr Leu Tyr Glu Ile Asn Ile

130

135

140

Asp Lys Tyr Asp Gly Ile Val Cys Val Gly Gly Asp Gly Met Phe Ser

145

150

155

160

Glu Val Leu His Gly Leu Ile Gly Arg Thr Gln Arg Ser Ala Gly Val

165

170

175

Asp Gln Asn His Pro Arg

180